Abstract

When using four transmit antennas, conventional channel coding is employed for a decoupled space-time coding approach for each of a number, L, of data substreams derived from the overall source bit stream. The symbols of the data substreams, after any encoding, are processed and the resulting derivatives of the encoded data substreams, which includes at least the complex conjugate of one of the encoded symbols, are grouped to form four transmit time sequences each one spanning L symbol periods which form a transmission matrix **B**. Each row of the matrix corresponds to an antenna, and the elements of each row represent the samples of a temporal sequence that is emitted by the antenna in L symbol periods. When $L=4$ the matrix **B** can be arranged as follows:

$$
\begin{array}{cccc}
 & T_1 & T_2 & T_3 & T_4 \\
\textit{Antenna } 1 & \begin{bmatrix} b_1 & b_2^* & b_3 & b_4^\times \\ b_2 & -b_1^\times & -b_4 & b_3^* \\ b_3 & b_4^* & -b_1 & -b_2^\times \\ b_4 & -b_3^* & b_2 & -b_1^* \end{bmatrix} \\
\textit{Antenna } 2 \\
\textit{Antenna } 3 \\
\textit{Antenna } 4
\end{array}
$$

where b_1, b_2, b_3, and b_4 are the encoded symbols from the data substreams and * indicates complex conjugate.